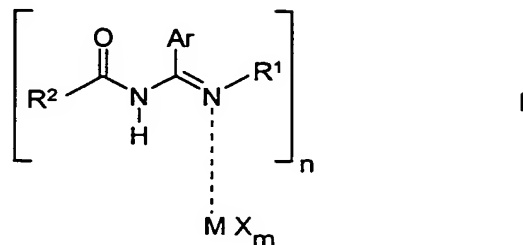


We claim:

1. An N'-substituted N-acylamidine-transition metal complex of the general formula I



5

where

10 M is a transition metal selected from the group of the metals Ni, Cu, Ru, Rh, Pd, Os, Ir and Pt

X is Cl, Br, triflate, methanesulfonate or p-toluenesulfonate

15 m is 0, 1 or 2,

n is 1, 2 or 3

and the radicals are defined as follows:

20 R¹, R² are each a straight-chain, branched or cyclic hydrocarbon radical having from 1 to 20 carbon atoms which may be mono- or polyunsaturated, an aromatic radical having from 6 to 14 ring members which may be bonded directly or via a C₁- to C₆-alkyl or C₂- to C₆-alkylene group, and the radicals mentioned may bear one or more substituents selected from the group of

25 C₁- to C₆-alkyl, C₁- to C₄-haloalkyl, OR³, NR⁴R⁵, COOR⁶, Si(R⁷)₃, Si(R⁷)₂R⁸, halogen, aryl, C₃-C₈-cycloalkyl,

R³, R⁶, R⁸ are each independently C₁- to C₁₂-alkyl, C₇- to C₁₂-aralkyl, C₆- to C₁₀-aryl, C₃- to C₈-cycloalkyl, C₃- to C₈-cycloalkyl in which one CH₂ group has been replaced by O, NH or NR⁹,

30

R⁴, R⁵, R¹⁰, R¹¹ are each independently hydrogen, straight-chain or branched C₁- to C₁₂-alkyl, C₇- to C₁₂-aralkyl, C₆- to C₁₀-aryl, C₃- to C₈-cycloalkyl or C₃- to C₈-cycloalkyl in which one CH₂ group has been replaced by O, NH or NR⁹,

17

and R^4 and R^5 and/or R^{10} and R^{11} may each together be $-(CH_2)_y-$, where y is an integer from 4 to 7;

R^7 , R^9 are each independently straight-chain or branched C_1 - to C_{12} -alkyl or C_7 - to C_{12} -aralkyl,

Ar is C_6 - C_{10} -aryl or hetaryl having from 5 to 10 ring members, and the radicals mentioned may be substituted by C_1 - to C_6 -alkyl, C_1 - to C_4 -haloalkyl, $NR^{10}R^{11}$, $COOR^6$, $Si(R^7)_3$, $Si(R^7)_2R^8$, OR^3 and/or halogen.

2. A transition metal complex of the formula I as claimed in claim 1 where M is a transition metal selected from the group of Ru, Rh, Os, Ir, Pd and Pt.

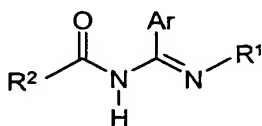
3. A transition metal complex of the formula I as claimed in claim 1 where M is Pd or Pt and m and n are each 2.

4. A transition metal complex of the formula I as claimed in any of claims 1 to 3 where

R^1 and R^2 are each branched or unbranched C_1 - to C_{12} -alkyl, C_7 - to C_{12} -aralkyl, C_6 - to C_{10} -aryl, and the radicals mentioned may be substituted by from one to three halogen atoms and/or one or two C_1 - C_6 -alkyl, trifluoromethyl and/or C_1 - to C_6 -alkoxy substituents, and

Ar is C_6 - C_{10} -aryl or hetaryl having 5 or 6 ring members, and the radicals mentioned may be substituted by one or more C_1 - to C_6 -alkyl, C_1 - to C_6 -alkoxycarbonyl, C_1 - to C_6 -alkoxy, trialkylsilyl or diarylalkylsilyl and/or trifluoromethyl substituents and/or halogen.

5. A process for preparing N'-substituted N-acylamidine-transition metal complexes of the general formula I as claimed in any of claims 1 to 4, which comprises dissolving an N'-substituted N-acylamidine ligand of the formula III



III

and a transition metal compound containing the desired central atom M according to formula I in an organic solvent or in a mixture of different organic solvents and

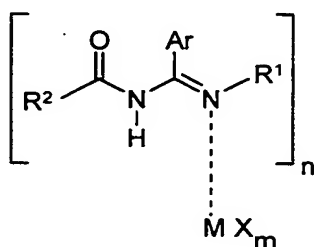
crystallizing the N'-substituted N-acylamidine-transition metal complex by adding a further solvent different to the solvent or solvent mixture used initially.

- 5 6. A process as claimed in claim 5, wherein the first solvent used is a halogenated or aromatic solvent or a mixture of different halogenated or aromatic solvents, and an ethereal solvent or solvent mixture is added for crystallization.
- 10 7. The use of an N'-substituted N-acylamidine-transition metal complex of the formula I as claimed in any of claims 1 to 4 as a catalyst.
- 15 8. The use as claimed in claim 7 for transition metal-catalyzed coupling reactions in which at least one new bond is formed between two carbon atoms.
9. The use as claimed in claims 7 and 8 for transition metal-catalyzed olefination, alkynylation, arylation or diaryl coupling reactions.

N'-Substituted N-acylamidine-transition metal complexes and their use as catalysts

Abstract

5 The present invention relates to N'-substituted N-acylamidine-transition metal complexes of the general formula I



10 where

M is a transition metal selected from the group of the metals Ni, Cu, Ru, Rh, Pd, Os, Ir and Pt

15 X is Cl, Br, triflate, methanesulfonate or p-toluenesulfonate

m is 0, 1 or 2,

n is 1, 2 or 3

and the radicals are defined as follows:

25 R^1, R^2 are each a straight-chain or branched, cyclic hydrocarbon radical having from 1 to 20 carbon atoms which may be mono- or polyunsaturated, an aromatic radical having from 3 to 6 ring members which may be bonded directly or via a C_1 - to C_6 -alkyl or C_2 - to C_6 -alkylene group, and the radicals mentioned may bear one or more substituents.

Ar is C₆- to C₁₀- aryl or hetaryl having from 5 to 10 ring members, and the radicals mentioned may be substituted by C₁- to C₆-alkyl, C₁- to C₄-haloalkyl, NR¹⁰R¹¹, COOR⁶, Si(R⁷)₃, Si(R⁷)₂R⁸, OR³ and/or halogen.

The invention further relates to a process for preparing this novel class of transition metal complexes and to their use as catalysts.